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NATIONAL DAM SAFETY PROGRAM. PORT JERVIS RESERVOIR NUMBER 3 (IN--ETC(U)
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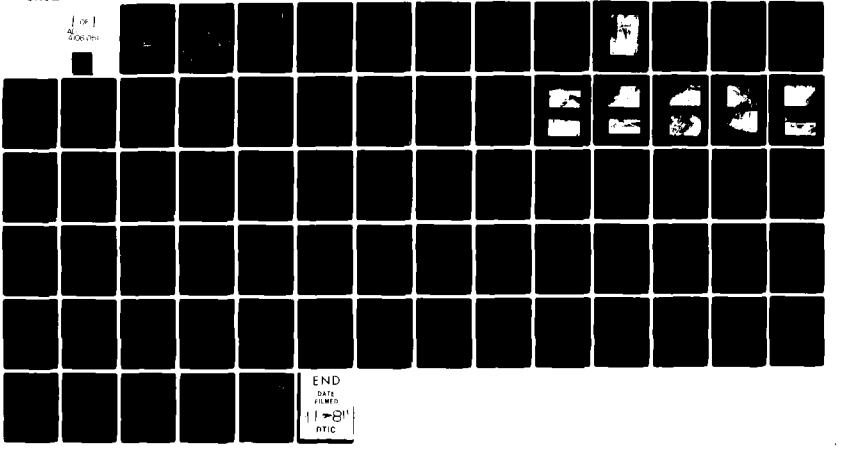

DELAWARE RIVER BASIN

PORT JERVIS RESERVOIR NO. 3

ORANGE COUNTY, NEW YORK

INVENTORY NO. N.Y. 495

PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM

NEW YORK DISTRICT CORP OF ENGINEERS

APRIL, 1981

SECURITY CLASSIFICATION OF THIS PAGE (When

REPORT DOCUMENTATION	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A106051	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Port Jervis Reservoir No. 3 Dam Delaware River Basin, Orange County, N.Y. Inventory No. 495		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) GEORGE KOCH	National Dam Safety Program. Port Jervis Reservoir Number 3 (Inventory Number NY. 495), Delaware River Basin, Orange County, New York. Phase I Inspection Report,	CONTRACT OR GRANT NUMBER(s) DACW51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12233		PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army 26 Federal Plaza New York District, CofE New York, New York 10287		12. REPORT DATE 5 August 1981
		13. NUMBER OF PAGES 120
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CofE New York, NY 10287		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

LEVEL

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release, Distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

"Original contains color plates: All DTIC reproductions will be in black and white"

DTIC ELECTE OCT 22 1981 S H

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Port Jervis Reservoir
No. 3 Dam
Orange County
Delaware River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of documents and the visual inspection of the Port Jervis Reservoir No. 3 did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to evaluate conditions affecting the dam. —> cont

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 54% of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged as "inadequate". There are several areas where seepage was found. Some point seepage along the toe of the embankment and in the spillway are the major concerns.

It is recommended that within three months of the date of the notification of the owner, additional engineering investigations of the seepage at the toe of the dam and the spillway should be commenced. Remedial actions deemed necessary based on the results of these investigations should be completed within eighteen months of the notification.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
PORT JERVIS RESERVOIR NO. 3 DAM I.D. No. NY 495
DEC # 164B-38 DELAWARE RIVER BASIN
ORANGE COUNTY

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Port Jervis Reservoir No. 3 (I.D. No. NY 495)
State Located:	New York
County Located:	Orange
Stream:	Unnamed tributary of the Delaware River
Date of Inspection:	November 20, 1980

ASSESSMENT

The examination of documents and the visual inspection of the Port Jervis Reservoir No. 3 did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to evaluate conditions affecting the dam.

Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 54% of the Probable Maximum Flood (PMF). Therefore, the spillway is adjudged as "inadequate". There are several areas where seepage was found. Some point seepage along the toe of the embankment and in the spillway are the major concerns.

It is recommended that within three months of the date of the notification of the owner, additional engineering investigations of the seepage at the toe of the dam and the spillway should be commenced. Remedial actions deemed necessary based on the results of these investigations should be completed within eighteen months of the notification.

Other deficiencies which should be corrected within 12 months are:

1. Remove tree and brush growth from both slopes of the dam and dike.
2. Backfill areas where erosion has removed material and depressions has resulted.
3. Repair deterioration of the diversion gate house.
4. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.
5. An emergency action plan must be developed.

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

roved By:

Col. W.M. Smith, Jr.
New York District Engineer

05 AUG 1981

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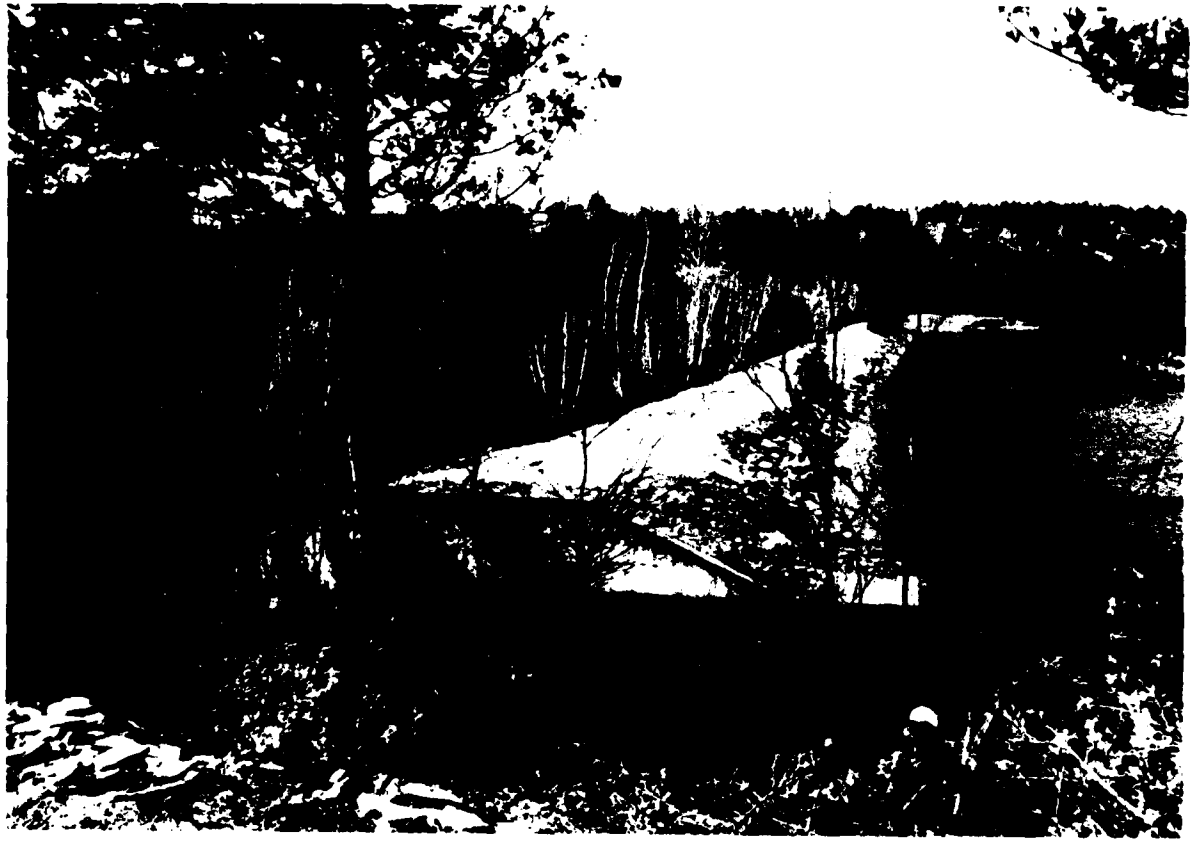


PHOTO # 1 OVERVIEW
PORT JERVIS RESERVOIR NO. 3 DAM

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
PORT JERVIS RESERVOIR No. 3 DAM I.D. No. NY 495
DEC # 164B-38 DELAWARE RIVER BASIN
ORANGE COUNTY

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to human life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Port Jervis Reservoir No. 3 dam consists of a 500 feet long earth embankment with a 30 foot concrete overflow spillway located at the left abutment. The spillway is tied into rock foundation; the outlet channel is in rock cut and has a laid up stone wall on the embankment side of the channel. The upstream and downstream slopes are 1 vertical to 2.25 horizontal; the crest width is 10 feet. Both upstream and downstream slopes are portected with small rip rap. A gate house is located on the downstream slope of the embankment over the original stream channel. There is a 6" and a 12" cast iron reservoir drain, which are both controlled in the gatehouse. A dike is located on the east side of the reservoir. It is an earth embankment approximately 15 feet high. There is a gate house located at the center of the dike which diverts flow into a natural channel leading to the Port Jervis Reservoir No. 1. The diversion pipe is a 12" cast iron pipe through the embankment.

b. Location

The dam is located on an unnamed tributary of the Delaware River in the Town of Deerpark, Orange County, New York.

c. Size

The dam is approximately 35 feet high and impounds 1223 acre feet at Spillway crest elevation. The dam is classified as "intermediate" in size (1000 to 50,000 acre feet).

d. Hazard Classification

The dam is classified as high hazard due to its location above Sparrow Bush, New York.

e. Ownership

The dam is owned by the City of Port Jervis, New York. The owner's representative is Mr. Melvin Decker, Water Superintendent, D.P.W. Port Jervis, NY (914) 856-7432.

f. Purpose of the Dam

The dam provides storage for the Port Jervis water supply.

g. Design and Construction History

The dam was constructed in 1912. It was believed to be designed and constructed under the supervision of Irving Righter. The builder was James Duele and Co.

h. Normal Operating Procedures

Water releases from Port Jervis Reservoir No. 3 are normally passed over the spillway. When required, additional reservoir releases through the intake on the dike divert flow to Port Jervis Reservoir No. 1. Reservoir No. 1 is located one mile away, towards and bordering on the City of Port Jervis.

1.3 PERTINENT DATA

a. Drainage area (mi. 2)	1.43
b. Elevations (ft. USGS datum)	
Top of Dam	1023.50
Spillway Crest	1019.0
c. Reservoir	
Surface area @ Spillway Crest (acres)	105.
Storage @ Top of Dam (acre feet)	1570.
Storage @ Spillway Crest (acre feet)	1223.
d. Dam	
Type: Earth fill with rip rap on both slopes.	
Length (ft):	500.
Upstream Slope	2.25
Downstream Slope:	2.25
Crest Width (ft):	10.
Height	35.
e. Dike	
Type: Earth fill with rip rap on the upstream slope	
Length (ft):	750.
Upstream Slope:	2.5:1
Downstream Slope:	2.5:1
Crest Width:	10.
Height	15.

f. Spillway

Type: Concrete weir tied into bedrock. Channel is bedrock with a stone wall on right side.

Weir Length (ft.):	30'
Capacity @ Top of Dam (cfs.):	1000.

g. Reservoir Drain:

Main dam: 6" and 12" cast iron pipe.
Dike: 12" cast iron pipe.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Port Jervis Reservoir No. 3 Dam is located in the "Appalachian Uplands" physiographic province of New York State. This province (northern extreme of the Appalachian Plateau) was formed by dissection of the uplifted but flat lying sandstones and shales of the Middle and Upper Devonian Catskill Delta. Relief is high to moderate. Maximum dissection occurs in the Catskill Mountain area, where only the mountain peaks approximate the original plateau surface. Drainage is generally south or southwest toward the Delaware River system.

b. Subsurface Investigations

The "General Soil Map of New York State" prepared by Cornell University Agriculture Experiment Station indicates that the surficial soils are Catskill and Wurtsboro of glacial till origin. These moderately well-drained soils are dominant on the less strongly sloping topography, but shallow soils and outcrops are on the steeper areas. Bedrock was observed outcropping in the spillway channel and the left abutment of the spillway.

c. Dam and Appurtenant Structures

The dam was designed by Irving Righter in 1912. There are no drawings or design data available. The design is of earth embankment with concrete overflow spillway tied into bedrock.

2.2 CONSTRUCTION RECORDS

No information regarding the construction of the dam was available other than the year of completion and the builder, 1912 and James Duele and Co.

2.3 OPERATION RECORD

All information concerning operation and maintenance of the dam is on file with the Port Jervis Water Superintendent, D.P.W.

2.4 EVALUATION OF DATA

The data presented in this report is compiled from information made available by the representatives of the City of Port Jervis and the files at New York State Department of Environmental Conservation. This information appears to be adequate and reliable for Phase I Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Port Jervis Reservoir No. 3 dam and surrounding watershed was conducted on November 20, 1980 and March 31, 1981. The weather was cloudy and the temperature ranged in the thirties; there was approximately 3 inches of snow on the ground in November and clear of snow in March. The inspection in November showed a reservoir level 5 feet below normal while the March inspection had a level of 6" below spillcrest.

b. Spillway

The spillway was rebuilt in 1968 and appears to be in good condition. The overflow section is tied into bedrock on the left abutment. The spillway channel floor and left wall is bedrock; the right wall adjacent to the embankment is concrete on the upper portion and stone on the lower portion. When the reservoir was lower than normal there were no signs of seepage, however, the March inspection showed approximately 5 gallons per minute seeping under the spillway weir (Photo #6). Brush was growing in the channel at the crest (Photo #4) and in the downstream channel.

c. Dam

The embankment is in need of maintenance. No evidence of misalignment or unstability of slopes was apparent and the rip rap protection on the slopes is well placed and stable. However, the entire downstream slope is heavily vegetated with trees and brush. The crest is showing signs of rounding off and some slight erosion. Several point seepage locations were found in a large boggy area at the downstream toe (Photos # 7 & 8). There was no material buildup at these points, apparently the seepage has been occuring for sometime. The gate house and reservoir drains have been kept in good condition and are operated on an annual basis. The left wall of the outlet channel has collapsed (Photo #9).

d. Dike

The dike on the east side of the reservoir is an earth embankment approximately 15 feet high and 750 feet long. It appears to be in good condition but in need of maintenance. There is some erosion and depressions on both slopes of the embankment. It is heavily vegetated. The gate house is in need of pointing up around the lower portion of the building. The diversion valve which is located in the gate house (Photo 13) and pipe are in good, operational condition.

e. Downstream Channel

The spillway channel bends around the left abutment of the embankment and back into the original stream channel. Natural rock is predominant. There is heavy tree and brush growth in and around the channel. A 24" culvert is located immediately downstream of the dam.

f. Reservoir

There are no visible signs of instability or sedimentation problems within the reservoir area.

3.2 EVALUATION

It is felt a further engineering investigation is required concerning the seepage. Other deficiencies listed require regular observations as well as maintenance and improvement work. These deficiencies are:

1. Remove tree and brush growth from both slopes of the dam and dike.

2. Backfill areas where erosion has removed material and depressions has resulted.

3. Repair deterioration of the diversion gate house.

4. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.

5. An emergency action plan must be developed.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The Port Jervis Reservoir No. 3 provides storage for the water supply system. It has the capability of diverting flow into a nautral channel leading to the Reservoir No. 1 or passing flows into the natural channel leading through Sparrow Bush. Normally, excess flows are passed over the uncontrolled spillway, the low level outlets through the dam are operated annually to lower the reservoir for the winter. The 12" cast iron diversion pipe to the water supply system has a manually operated valve located in the gate house on the dike. The 12" and 6" low level outlets have manually operated valves located in the gate house at the toe of the dam.

4.2 MAINTENANCE OF THE DAM

Maintenance is on an "as needed" basis for the Reservoir No. 3 dam.

4.3 MAINTENANCE OF OPERATING FACILITIES

Maintenance of the valves and gate houses appears to be adequate. All valves are reported operational. No operations manual is on file.

4.4 WARNING SYSTEM IN EFFECT

There is no warning system in effect or in preparation.

4.5 EVALUATION

These remedial measures are required to provide the proper maintenance. Maintenace has been inadequate as evidenced by the deficiencies indicated in Section 3.2.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Port Jervis Reservoir No. 3 dam is located on an unnamed tributary to the Delaware River. The drainage area of the watershed is 1.43 square miles. The terrain is moderate to high in slope, and the area is primarily wooded. Drainage is generally moderate to well in the glacial till local to the area.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers' HEC-1 Computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph, and the Modified Puls routing procedu4e was incorporated. The Probable Maxim Precipitation (PMP) was 21.2 inches (24 hrs., 200 sq. miles) from Hydrometeorological Report #33 in accordance with the recommended guidelines of the Corps of Engineers. Several floods %'s of the Probable Maximum Flood (PMF)) were selected for analysis. The full PMF inflow of 3254 was routed through the reservoir and found to produce an outflow of 3221. cfs. The 1/2 PMF inflow was 1629. cfs resulting in an outflow of 990. cfs. Which can be discharged without overtopping.

5.3 SPILLWAY CAPACITY

The spillway is a 30 feet wide uncontrolled concrete weir. The crest elevation is 1019.0 USGS datum with a maximum flow depth of 4.5 feet before overtopping of the dam begins to occur. The maximum capacity of the spillway is 1000 cfs at the top of the dam.

5.4 RESERVOIR CAPACITY

The reservoir capacity is at the crest of the spillway and at the top of the dam are 1223. and 1570. acre feet respectively. Surcharge storage between spillway and top of dam is equivalent to 4.5 inches of runoff from the watershed.

5.5 FLOODS OF RECORD

There are no gaging stations located on or near the dam site, nor are there any accounts of high flows or levels.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillway before overtopping occurs is 1000 cfs, which is 54 % of the routed PMF outflow of 3221 cfs. The dam is overtopped by 0.68 feet during the full PMF event.

5.7 EVALUATION

The Port Jervis Reservoir No. 3 dam will be overtopped by 0.68 feet during the PMF, based on the Corps of Engineers' screening criteria it is considered inadequate . However, the spillway can safely discharge the routed 1/2 PMF of 990 cfs.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of major distress were observed in connection with the earth portion of the embankment.

b. Design and Construction Data

No information could be located concerning the stability analysis of the earth embankment.

c. Post Construction Changes

The only construction that has been done on the structure was in 1968. The spillway wall and weir had some concrete work performed. No plans are available of the work that was done.

d. Seismic Stability

The dam is located in seismic Zone 1. Seismic forces in this zone are not considered to be of significant magnitude to influence the stability of the structure. A detailed stability analysis of the earth embankment is beyond the scope of this report. The "Preliminary Brittle Structures Map of New York", by Isachsen and McKendree, indicates that no faulting or slides are present within the watershed area or near the dam.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of the Port Jervis Reservoir No. 3 dam revealed that the spillway is "Inadequate" based upon the Corps of Engineers' screening criteria. The dam will be overtopped by all storms in excess of 54% of the PMF. The embankment appears stable; however, there is some seepage which will require further engineering investigation.

b. Adequacy of Information

The information reviewed is considered adequate for Phase I inspection purposes.

c. Need for Additional Investigation

Further investigation concerning the seepage should be initiated within three months of the date of notification of the owner. The other areas listed below requiring remedial action should be completed within 18 months of notification to the owner.

1. Based on the results of the seepage investigations, remedial treatment shall be performed.

2. Remove the tree and brush growth from all slopes of the dam and dike.

3. Backfill areas where erosion has removed material and depressions have resulted.

4. Repair deterioration of the diversion gate house.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.

6. An emergency action plan must be developed.

d. Urgency

The engineering investigation concerning the seepage should be initiated within three months of date of notification of the owner. The other areas listed below requiring remedial action should be completed within 18 months of notification to the owner.

7.2 RECOMMENDATIONS

1. Based on the results of the seepage investigations, remedial treatment shall be performed.

2. Remove the tree and brush growth from all slopes of the dam and dike.

3. Backfill areas where erosion has removed material and depressions have resulted.

4. Repair deterioration of the diversion gate house.

5. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future refererence.

6. An emergency action plan must be developed.

APPENDIX A

PHOTOGRAPHS

PHOTO #2
UPSTREAM SLOPE OF EMBANKMENT.
NOTE: EROSION AT UPPER LINE OF RIP RAP.

PHOTO #3
DOWNSTREAM SLOPE. NOTE: HEAVY VEGETATION

PHOTO #4.
SPILLWAY CHANNEL LOOKING UPSTREAM.
NOTE: TREE AND BRUSH GROWTH.

PHOTO #5.
SPILLWAY CONTROL SECTION.

PHOTO #6.
SEEPAGE AROUND THE SPILLWAY WEIR.

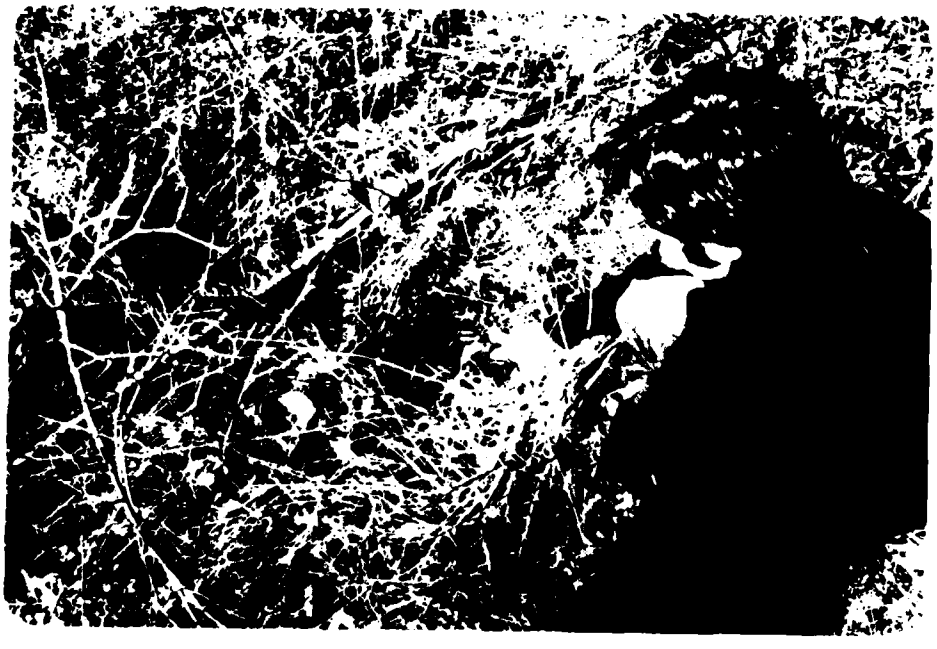


PHOTO #7.

SEEPAGE AT THE TOE OF THE EMBANKMENT.

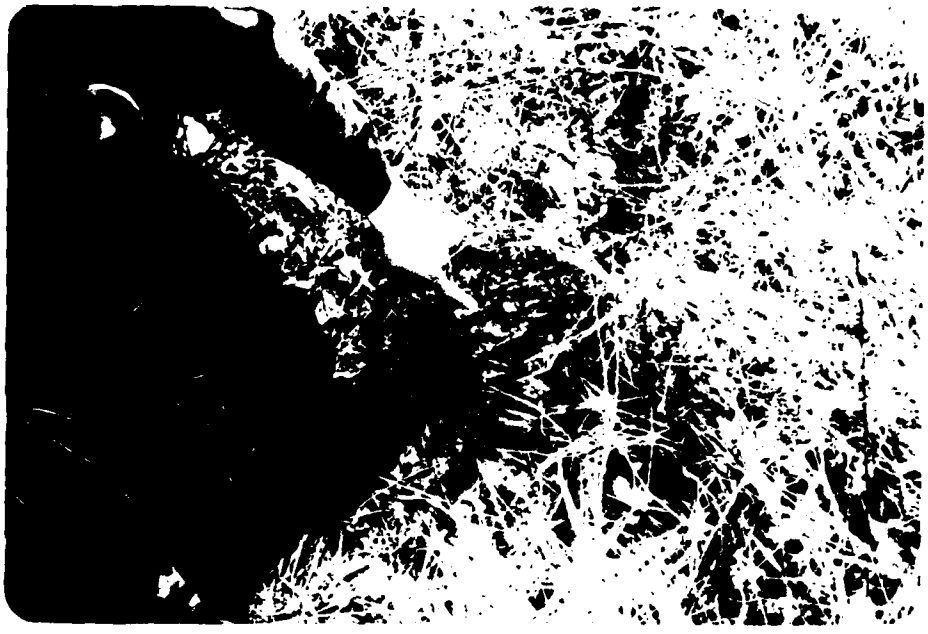


PHOTO #8.
SEEPAGE AT THE TOE OF THE EMBANKMENT.

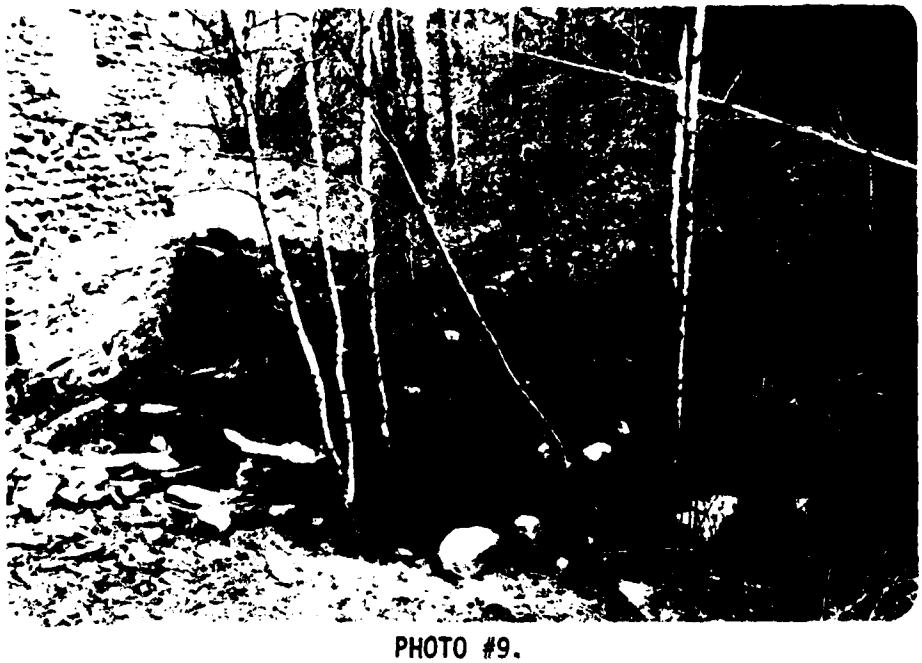


PHOTO #9.
RESERVOIR DRAIN AND GATE HOUSE. NOTE:
COLLAPSED WALL.

PHOTO # 12.
EAST DIKE. NOTE: VEGETATION ON DOWNSTREAM SLOPE.

PHOTO #13.
GATE HOUSE ON EAST DIKE. NOTE: VEGETATION ON UPSTREAM SLOPE.

APPENDIX B

VISUAL INSPECTION CHECKLIST

93-15-3(9/80)

VISUAL INSPECTION CHECKLIST

1) **Basic Data**

a. General

Name of Dam Port Jervis Res. No. 3

Fed. I.D. # NY 495 DEC Dam No. 164B-38

River Basin Delaware

Location: Town DEERPARK County ORANGE

Stream Name UNNAMED trib. Delaware

Tributary of Delaware

Latitude (N) 41° 29.6' Longitude (W) 74° 41.3'

Type of Dam EARTH FILL / WATER SUPPLY

Hazard Category high

Date(s) of Inspection NOV 20, 1980 / MAR. 31, 1981

Weather Conditions cloudy 30's / clear 50's

Reservoir Level at Time of Inspection 5' below spillcrest / 6" below spillcrest

b. Inspection Personnel K. Harmer, J. Veitch, R. Durrin

c. Persons Contacted (Including Address & Phone No.)

Melvin Decker
Water Superintendent, DPW
Port Jervis NY
(914) 856-7432

d. History:

Date Constructed 1912 Date(s) Reconstructed Spillway 1963

Designer IRVING Righter

Constructed By James Ducle & Co.

Owner City of Port Jervis.

93-15-3(9/80)

2) Embankment

a. Characteristics

(1) Embankment Material EARTH

(2) Cutoff Type Unknown

(3) Impervious Core Unknown

(4) Internal Drainage System Unknown

(5) Miscellaneous

b. Crest

(1) Vertical Alignment good

(2) Horizontal Alignment good

(3) Surface Cracks none

(4) Miscellaneous rounding off / some erosion

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1:2.25

(2) Undesirable Growth or Debris, Animal Burrows several pine trees

(3) Sloughing, Subsidence or Depressions minor sloughing

(4) Slope Protection rip rap holding up well

(5) Surface Cracks or Movement at Toe None

d. Downstream Slope

(1) Slope (Estimate - V:H) 1:2.25

(2) Undesirable Growth or Debris, Animal Burrows heavy tree growth

(3) Sloughing, Subsidence or Depressions none

(4) Surface Cracks or Movement at Toe none

(5) Seepage several point seepages see photos boggy area @ toe

(6) External Drainage System (Ditches, Trenches; Blanket) unknown

(7) Condition Around Outlet Structure good, except for part of wall collapsed

(8) Seepage Beyond Toe not found

e. Abutments - Embankment Contact

good. rock @ left overburden @ right.

93-15-3(9/80)

(1) Erosion at Contact None

(2) Seepage Along Contact None

3) Drainage System

a. Description of System Unknown

b. Condition of System Unknown

c. Discharge from Drainage System Unknown

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

None

93-15-3(9/80)

5) Reservoir

a. Slopes stable, heavy vegetated

b. Sedimentation No excessive

c. Unusual Conditions Which Affect Dam None

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) road several homes / Sparrow Bush

b. Seepage, Unusual Growth Several points of heavy seepage @ low reservoir el.

c. Evidence of Movement Beyond Toe of Dam None

d. Condition of Downstream Channel wall collapsed, generally good

7) Spillway(s) (Including Discharge Conveyance Channel)

a. General seepage around & under wall - founded on bedrock, walls good condition

b. Condition of Service Spillway

c. Condition of Auxiliary Spillway n/a

d. Condition of Discharge Conveyance Channel heavy vegetation should be cleared

8) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit _____ Other _____

Material: Concrete _____ Metal C.I. Other _____

Size: 6" & 12" Length ?

Invert Elevations: Entrance ? Exit ~ 995

Physical Condition (Describe): good Unobservable _____

Material: good

Joints: apparently OK Alignment o.k.

Structural Integrity: sound

Hydraulic Capability: ?

Means of Control: Gate _____ Valve ✓ Uncontrolled _____

Operation: Operable ✓ Inoperable _____ Other _____

Present Condition (Describe): good - operated annually.

9) Structural

a. Concrete Surfaces good

b. Structural Cracking none

c. Movement - Horizontal & Vertical Alignment (Settlement) none

d. Junctions with Abutments or Embankments good

e. Drains - Foundation, Joint, Face good

f. Water Passages, Conduits, Sluices good

g. Seepage or Leakage previously noted

h. Joints - Construction, etc. N/A

i. Foundation [illegible]

j. Abutments good

k. Control Gates [illegible]

l. Approach & Outlet Channels [illegible]

m. Energy Dissipators (Plunge Pool, etc.) N/A

n. Intake Structures [illegible] need maintenance

o. Stability good

p. Miscellaneous —

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition gatehouse on dam
good condition

gatehouse on dike needs
maintenance

11) Operation Procedures (Lake Level Regulation):

regulated by releases through dam
& water supply to Res. No. 1

APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1023.5	—	1570.
2) Design High Water (Max. Design Pool)	—	—	—
3) Auxiliary Spillway Crest	—	—	—
4) Pool Level with Flashboards	—	—	—
5) Service Spillway Crest	1019.0	105	1223

DISCHARGES

	Volume (cfs)
1) Average Daily	2.±
2) Spillway @ Maximum High Water	1000 cfs.
3) Spillway @ Design High Water	—
4) Spillway @ Auxiliary Spillway Crest Elevation	—
5) Low Level Outlet	—
6) Total (of all facilities) @ Maximum High Water	1000 cfs
7) Maximum Known Flood	—
8) At Time of Inspection	below crest

CREST: ELEVATION: 1023.50

Type: EARTH FILL w/ RIPRAP

Width: 10' Length: 500

Spillover NONE

Location —

SPILLWAY:

SERVICE		AUXILIARY
1019.	Elevation	—
concrete weir	Type	—
30'	Width	
	Type of Control	
uncontrolled	Uncontrolled	—
	Controlled:	
—	Type (Flashboards; gate)	—
—	Number	—
—	Size/Length	
	Invert Material	—
	Anticipated Length of operating service	—
150' rock channel	Chute Length	—
2' vert. then 3:1 slope.	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	—

HYDROMETEROLOGICAL GAGES:

Type : None

Location: —

Records: —

Date - —

Max. Reading - —

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

6"ϕ12" C.I. drain (unknown inverted.)

DRAINAGE AREA: 1.43 Sq. Mi.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: primarily wooded

Terrain - Relief: moderate slope

Surface - Soil: moderate to well drained glacial till

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

No planned or probable changes to watershed

Potential Sedimentation problem areas (natural or man-made; present or future)

none apparent

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

No backwater problems

Dikes - Floodwalls (overflow & non-overflow) - ~~Low reaches along the Reservoir perimeter~~:

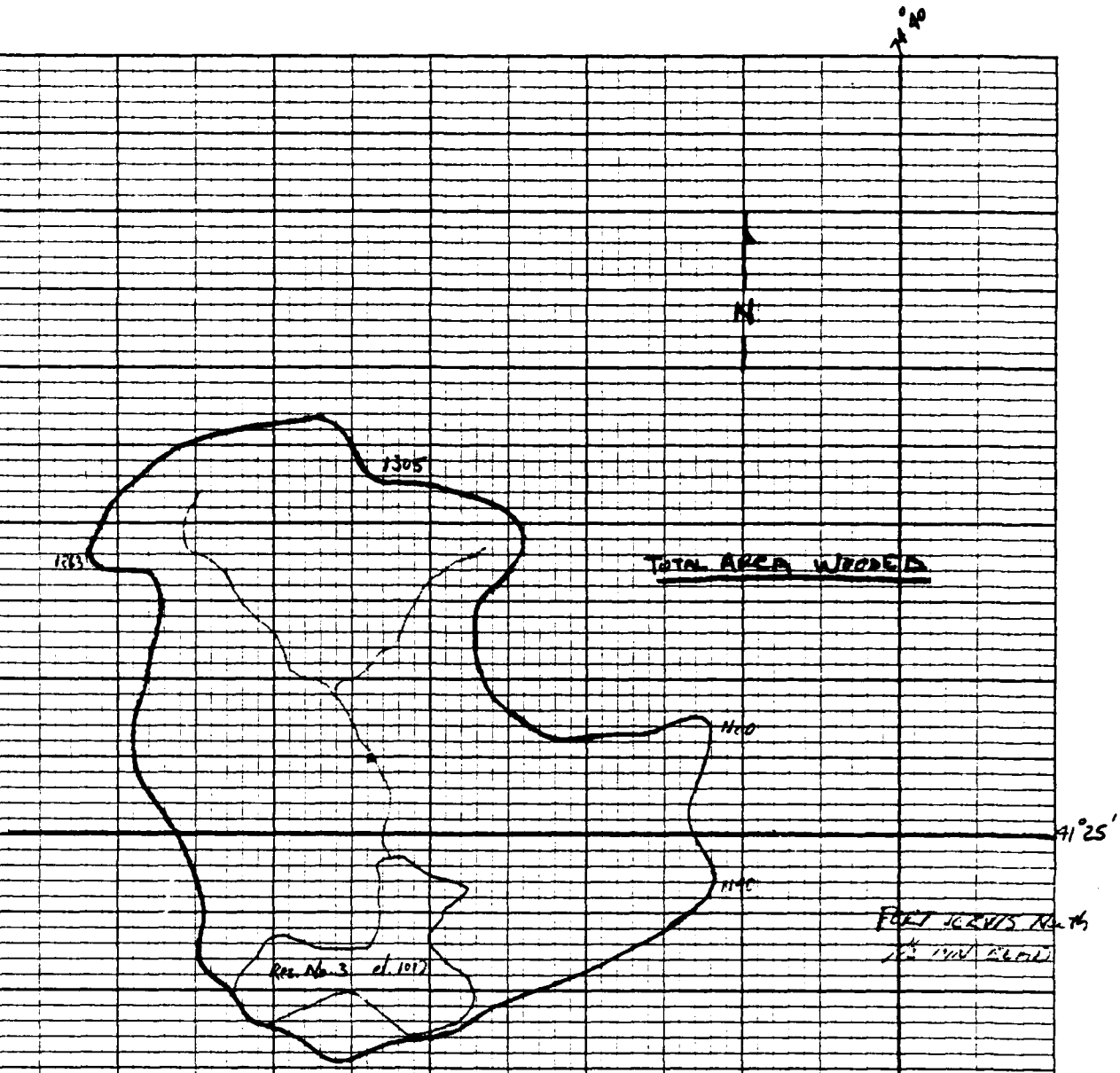
Location: east side of reservoir (750' earth)

Elevation: 1023.5

Reservoir:

Length @ Maximum Pool 0.6 (Miles)

Length of Shoreline (@ Spillway Crest) 1.8 (Miles)



$DA_{mm} = 9.59^{\square}\,(24000)^2 \times \frac{1}{(5280)^2 \times 43560} = 1.43\ mi^2$

$A_{UNC} = 0.85^{\square}$ " $= 0.12$

$\bar{S} = 0.03$

$L_{ca} = 2.1'' (24000) \frac{1}{12} (5280) = 0.80\ mi.$

$L = 9.5''$ " $= 1.70\ mi.$

$C_t = 2.0 \quad C_p = 0.625$

$t_p = C_t (L \times L_{ca})^{.3} = 2.0(.8 \times 1.7)^{.3} = 2.19$

$t_r = t_p / 5.5 = 0.39 \qquad T_R = 15\ MIN = .25\ hr.$

$T_p = 2.19 + 0.25(.25 - .39) = 2.16$

Time interval = 15 MIN.

PORT JERVIS No. 3 — TOP OF DAM = 1023.3 — Nov. 20, 1980

SPILLWAY CAPACITY — Weir length = 30' — C - From King & Brater, Handbook of Hyd.

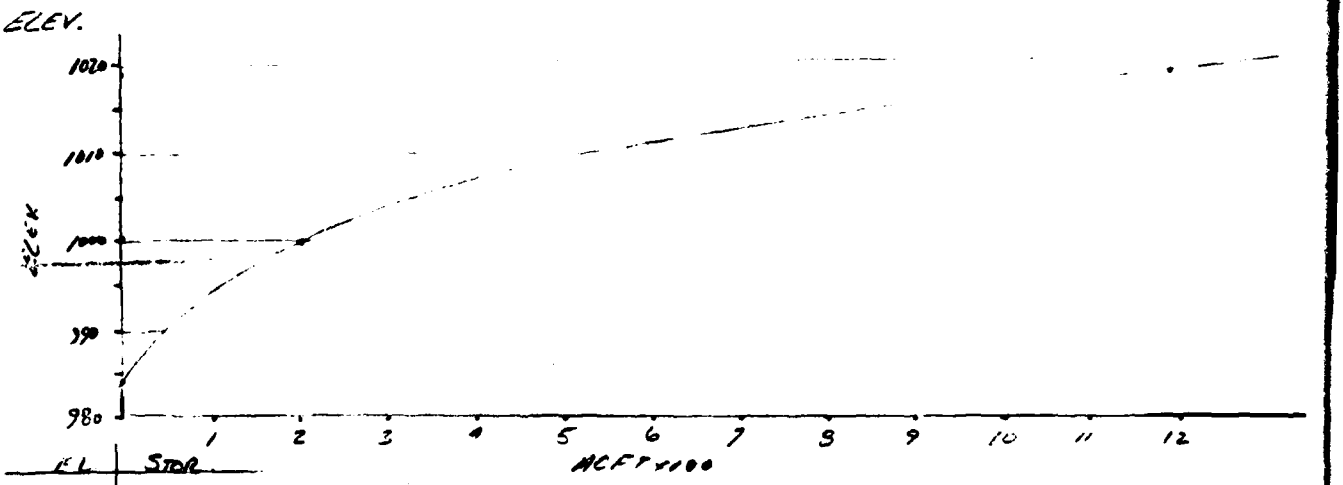
$Q = CLH^{3/2}$

el.	h.	C	L	Q (cfs)
1019	-	-	30	0
1020	1	3.0		90
1021	2	3.3		280
1022	3	3.32		517
1023	4	3.32		797
1023.3	4.3	3.40		910
1023.5	4.5	3.50		1000

12" DRAIN — NORMAL CAPACITY

6" DRAIN

RESERVOIR CAPACITY — NO DATA - INTERPOLATE CONTOURS & MEASURE AREA



EL	STOR
984	0
990	50
1000	205
1010	530
1020	1300

DAM Length MAIN DAM 500'
EAST DIKE 750'

C = 5.0 1.5

RAINFALL

E" PMP = 21.2"

% -	6	12	24	48 hr
	111	123	133	142

```
                                                                                NEW YORK STATE
                                                                                DEPT OF ENVIRONMENTAL CONSERVATION
                                                                                FLOOD PROTECTION BUREAU
  1          B1  PORT JERVIS RESERVOIR NO. 3
  2          B2
  3          B3
  4          C     200       0       1.      .       0       0       0       0       0       0
  5          D     1
  6          J     1         6       1
  7          J1    .7        .9      .3      .0      .8      1
  8          K                 1                       2               1
  9          K1  INFLOW FROM BASIN
 10          K     1         1       1.43
 11                            21.2    111     123     133     142
 12                                                                    1.0     0.1
 13          K     .1        .525
 14          K     -.2       -.1     1
 15                1         1                       2               1
 16          K1  ROUT  INFLOW HYDROGRAPH THROUGH RESERVOIR
 17          K                                 1       1
 18          K1    1                                                 -1019   -1
 19          K4  1010      1020    1021    1022    1023    1023.5
 20          K5            90      290     517     910     1000
 21          K     3       30      20.     530     1300
 22          K     910     990     1000    1010    1020
 23          K8  1014
 24          D1  3.        3       1.      1250
 25          K     .4
 26          K
 27          K
 28          K
 29          K
 30          K
```

PR[illegible] STREAM NETWORK CALCULATIONS
[illegible] HYDROGRAPH AT 1
[illegible] HYDROGRAPH TO 1
END OF NETWORK

N W YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU

PORT JERVIS RESERVOIR NO. 5

JOB SPECIFICATION

NJ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
200	0	1	0	0	0	0	0	0	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

SUB-AREA RUNOFF COMPUTATION

INFLOW FROM BASIN

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	2	0	1	0	0

HYDROGRAPH DATA

IHOG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.43	0.	1.43	0.	0.	0	0	0

PRECIP DATA

SPFE	PAR	PC	R12	R24	R48	R72	R96
0.	21.00	111.00	123.00	133.00	142.00	0.	0.

THIS COMPUTER PROGRAM IS 0.100

LOSS DATA

LKOPT	STRKS	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
3	3.	0.	1.00	0.	0.	1.00	1.00	0.10	0.	0.

UNIT HYDROGRAPH DATA
TP= 2.14 CP=0.65 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.00
AREA UNIT HYDROGRAPH COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 9.71 AND R= 8.03 INTERVALS

UNIT HYDROGRAPH 48 END-OF-PERIOD ORDINATES, LAG= 2.14 HOURS, CP= 0.62 VOL= 1.00

73.	96.	76.	114.	165.	209.	243.	264.	272.	263.
241.	210.	183.	159.	135.	128.	113.	97.	88.	78.
74.	68.	55.	47.	42.	37.	32.	29.	25.	22.
18.	17.	15.	14.	12.	11.	9.	8.	7.	6.
5.	4.	4.	4.	3.	3.	3.	2.		

END-OF-PERIOD FLOW

HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
0.15	1	0.00	0.	0.00	0.	1.02	1.15	101	0.03	0.00	0.03	7.

1.01	0.45	3	0.00	0.	0.00	3.	1.02	1.45	103	0.03	0.00	0.03	8.
1.01	1.00	4	0.00	0.	0.00	3.	1.02	2.00	104	0.03	0.00	0.03	8.
1.01	1.15	5	0.00	0.	0.00	3.	1.02	2.15	105	0.03	0.00	0.03	9.
1.01	1.30	6	0.00	0.	0.00	3.	1.02	2.30	106	0.03	0.00	0.03	10.
1.01	1.45	7	0.00	0.	0.00	3.	1.02	2.45	107	0.03	0.00	0.03	10.
1.01	2.00	8	0.00	0.	0.00	3.	1.02	3.00	108	0.03	0.00	0.03	11.
1.01	2.15	9	0.00	0.	0.00	3.	1.02	3.15	109	0.03	0.00	0.03	11.
1.01	2.30	10	0.00	0.	0.00	3.	1.02	3.30	110	0.03	0.00	0.03	12.
1.01	2.45	11	0.00	0.	0.00	3.	1.02	3.45	111	0.03	0.00	0.03	12.
1.01	3.00	12	0.00	0.	0.00	3.	1.02	4.00	112	0.03	0.00	0.03	12.
1.01	3.15	13	0.00	0.	0.00	3.	1.02	4.15	113	0.03	0.00	0.03	12.
1.01	3.30	14	0.00	0.	0.00	3.	1.02	4.30	114	0.03	0.00	0.03	13.
1.01	3.45	15	0.00	0.	0.00	3.	1.02	4.45	115	0.03	0.00	0.03	13.
1.01	4.00	16	0.00	0.	0.00	3.	1.02	5.00	116	0.03	0.00	0.03	13.
1.01	4.15	17	0.00	0.	0.00	3.	1.02	5.15	117	0.03	0.00	0.03	13.
1.01	4.30	18	0.00	0.	0.00	3.	1.02	5.30	118	0.03	0.00	0.03	13.
1.01	4.45	19	0.00	0.	0.00	3.	1.02	5.45	119	0.03	0.00	0.03	14.
1.01	5.00	20	0.00	0.	0.00	3.	1.02	6.00	120	0.03	0.00	0.03	14.
1.01	5.15	21	0.00	0.	0.00	3.	1.02	6.15	121	0.08	0.06	0.03	14.
1.01	5.30	22	0.00	0.	0.00	3.	1.02	6.30	122	0.08	0.06	0.03	17.
1.01	5.45	23	0.00	0.	0.00	3.	1.02	6.45	123	0.08	0.06	0.03	21.
1.01	6.00	24	0.00	0.	0.00	3.	1.02	7.00	124	0.08	0.06	0.03	28.
1.01	6.15	25	0.01	0.	0.01	3.	1.02	7.15	125	0.08	0.06	0.03	37.
1.01	6.30	26	0.01	0.	0.01	3.	1.02	7.30	126	0.08	0.06	0.03	49.
1.01	6.45	27	0.01	0.	0.01	3.	1.02	7.45	127	0.08	0.06	0.03	63.
1.01	7.00	28	0.01	0.	0.01	3.	1.02	8.00	128	0.08	0.06	0.03	78.
1.01	7.15	29	0.01	0.	0.01	3.	1.02	8.15	129	0.08	0.06	0.03	93.
1.01	7.30	30	0.01	0.	0.01	3.	1.02	8.30	130	0.08	0.06	0.03	108.
1.01	7.45	31	0.01	0.	0.01	3.	1.02	8.45	131	0.08	0.06	0.03	122.
1.01	8.00	32	0.01	0.	0.01	3.	1.02	9.00	132	0.08	0.06	0.03	134.
1.01	8.15	33	0.01	0.	0.01	3.	1.02	9.15	133	0.08	0.06	0.03	144.
1.01	8.30	34	0.01	0.	0.01	3.	1.02	9.30	134	0.08	0.06	0.03	154.
1.01	8.45	35	0.01	0.	0.01	3.	1.02	9.45	135	0.08	0.06	0.03	162.
1.01	9.00	36	0.01	0.	0.01	3.	1.02	10.00	136	0.08	0.06	0.03	169.
1.01	9.15	37	0.01	0.	0.01	3.	1.02	10.15	137	0.08	0.06	0.03	175.
1.01	9.30	38	0.01	0.	0.01	3.	1.02	10.30	138	0.08	0.06	0.03	181.
1.01	9.45	39	0.01	0.	0.01	3.	1.02	10.45	139	0.08	0.06	0.03	186.
1.01	10.00	40	0.01	0.	0.01	3.	1.02	11.00	140	0.08	0.06	0.03	190.
1.01	10.15	41	0.01	0.	0.01	3.	1.02	11.15	141	0.08	0.06	0.03	194.
1.01	10.30	42	0.01	0.	0.01	3.	1.02	11.30	142	0.08	0.06	0.03	198.
1.01	10.45	43	0.01	0.	0.01	3.	1.02	11.45	143	0.08	0.06	0.03	201.
1.01	11.00	44	0.01	0.	0.01	3.	1.02	12.00	144	0.08	0.06	0.03	203.
1.01	11.15	45	0.01	0.	0.01	3.	1.02	12.15	145	0.47	0.45	0.02	210.
1.01	11.30	46	0.01	0.	0.01	3.	1.02	12.30	146	0.47	0.45	0.02	226.
1.01	11.45	47	0.01	0.	0.01	3.	1.02	12.45	147	0.47	0.45	0.02	257.
1.01	12.00	48	0.01	0.	0.01	3.	1.02	13.00	148	0.47	0.45	0.02	305.
1.01	12.15	49	0.03	0.	0.03	3.	1.02	13.15	149	0.56	0.54	0.02	371.
1.01	12.30	50	0.03	0.	0.03	3.	1.02	13.30	150	0.56	0.54	0.02	456.
1.01	12.45	51	0.03	0.	0.03	3.	1.02	13.45	151	0.56	0.54	0.02	558.
1.01	13.00	52	0.03	0.	0.03	3.	1.02	14.00	152	0.56	0.54	0.02	672.
1.01	13.15	53	0.04	0.	0.04	3.	1.02	14.15	153	0.71	0.68	0.02	795.
1.01	13.30	54	0.04	0.	0.04	3.	1.02	14.30	154	0.71	0.68	0.02	922.
1.01	13.45	55	0.04	0.	0.04	3.	1.02	14.45	155	0.71	0.68	0.02	1048.
1.01	14.00	56	0.04	0.	0.04	3.	1.02	15.00	156	0.71	0.68	0.02	1172.
1.01	14.15	57	0.05	0.	0.05	3.	1.02	15.15	157	0.72	0.69	0.02	1293.
1.01	14.30	58	0.05	0.	0.05	3.	1.02	15.30	158	1.43	1.41	0.03	1418.
1.01	14.45	59	0.05	0.	0.05	3.	1.02	15.45	159	4.01	3.98	0.03	1585.
1.01	15.00	60	0.05	0.	0.05	3.	1.02	16.00	160	1.00	0.98	0.02	1813.
1.01	15.15	61	0.05	0.	0.05	3.	1.02	16.15	161	0.66	0.63	0.02	2077.
1.01	15.30	62	0.10	0.	0.10	3.	1.02	16.30	162	0.66	0.63	0.02	2355.
1.01	15.45	63	0.27	0.06	0.21	4.	1.02	16.45	163	0.66	0.63	0.02	2631.
1.01	16.00	64	0.07	0.04	0.03	6.	1.02	17.00	164	0.66	0.63	0.02	2880.
1.01	16.15	65	0.04	0.02	0.03	10.	1.02	17.15	165	0.52	0.49	0.02	3074.
1.01	16.30	66	0.04	0.02	0.03	15.	1.02	17.30	166	0.52	0.49	0.02	3200.
1.01	16.45	67	0.04	0.02	0.03	21.	1.02	17.45	167	0.52	0.49	0.02	3254.

1.01	17.15	69	0.04	0.01	0.03	35.	1.02	18.15	169	0.04	0.02	0.03	3114.
1.01	17.30	70	0.04	0.01	0.03	42.	1.02	18.30	170	0.04	0.02	0.03	2971.
1.01	17.45	71	0.04	0.01	0.03	47.	1.02	18.45	171	0.04	0.02	0.03	2814.
1.01	18.00	72	0.04	0.01	0.03	51.	1.02	19.00	172	0.04	0.02	0.03	2643.
1.01	18.15	73	0.00	0.	0.00	53.	1.02	19.15	173	0.04	0.02	0.03	2459.
1.01	18.30	74	0.00	0.	0.00	53.	1.02	19.30	174	0.04	0.02	0.03	2263.
1.01	18.45	75	0.00	0.	0.00	52.	1.02	19.45	175	0.04	0.02	0.03	2061.
1.01	19.00	76	0.00	0.	0.00	49.	1.02	20.00	176	0.04	0.02	0.03	1859.
1.01	19.15	77	0.00	0.	0.00	47.	1.02	20.15	177	0.04	0.02	0.03	1663.
1.01	19.30	78	0.00	0.	0.00	43.	1.02	20.30	178	0.04	0.02	0.03	1479.
1.01	19.45	79	0.00	0.	0.00	40.	1.02	20.45	179	0.04	0.02	0.03	1313.
1.01	20.00	80	0.00	0.	0.00	36.	1.02	21.00	180	0.04	0.02	0.03	1167.
1.01	20.15	81	0.00	0.	0.00	33.	1.02	21.15	181	0.04	0.02	0.03	1038.
1.01	20.30	82	0.00	0.	0.00	29.	1.02	21.30	182	0.04	0.02	0.03	924.

1.01	20.45	83	0.00	0.	0.00	24.	1.02	21.45	183	0.04	0.02	0.03	824.
1.01	21.00	84	0.00	0.	0.00	23.	1.02	22.00	184	0.04	0.02	0.03	735.
1.01	21.15	85	0.00	0.	0.00	21.	1.02	22.15	185	0.04	0.02	0.03	656.
1.01	21.30	86	0.00	0.	0.00	19.	1.02	22.30	186	0.04	0.02	0.03	587.
1.01	21.45	87	0.00	0.	0.00	17.	1.02	22.45	187	0.04	0.02	0.03	526.
1.01	22.00	88	0.00	0.	0.00	15.	1.02	23.00	188	0.04	0.02	0.03	472.
1.01	22.15	89	0.00	0.	0.00	14.	1.02	23.15	189	0.04	0.02	0.03	425.
1.01	22.30	90	0.00	0.	0.00	13.	1.02	23.30	190	0.04	0.02	0.03	383.
1.01	22.45	91	0.00	0.	0.00	11.	1.02	23.45	191	0.04	0.02	0.03	346.
1.01	23.00	92	0.00	0.	0.00	10.	1.03	0.	192	0.04	0.02	0.03	325.
1.01	23.15	93	0.00	0.	0.00	10.	1.03	0.15	193	0.	0.	0.	325.
1.01	23.30	94	0.00	0.	0.00	9.	1.03	0.30	194	0.	0.	0.	325.
1.01	23.45	95	0.00	0.	0.00	8.	1.03	0.45	195	0.	0.	0.	325.
1.02	0.	96	0.00	0.	0.00	7.	1.03	1.00	196	0.	0.	0.	325.
1.02	0.15	97	0.03	0.00	0.03	7.	1.03	1.15	197	0.	0.	0.	325.
1.02	0.30	98	0.03	0.00	0.03	7.	1.03	1.30	198	0.	0.	0.	325.
1.02	0.45	99	0.03	0.00	0.03	6.	1.03	1.45	199	0.	0.	0.	325.
1.02	1.00	100	0.03	0.00	0.03	6.	1.03	2.00	200	0.	0.	0.	325.
									SUM	24.08	20.38	3.70	75692.
										(612.)	(518.)	(94.)	(2143.36)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3254.	2275.	775.	378.	75523.
CMS	92.	64.	22.	11.	2139.
INCHES		14.80	20.17	20.47	20.47
MM		375.96	512.21	519.94	519.94
AC-FT		1128.	1537.	1560.	1560.
THOUS CU M		1392.	1896.	1925.	1925.

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	400.	800.	1200.	1600.	2000.	2400.	2800.	3200.	3600.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	PRECIP(L) AND EXCESS(X) 4.	2.	0.
0.15	1I												L
0.30	2I												L
0.45	3I												L
1.00	4I												L
1.15	5I												L
1.30	6I												L
1.45	7I												L
2.00	8I												L
2.15	9I												L
2.30	10I												L
2.45	11I												L
3.00	12I												L
3.15	13I												L
3.30	14I												L
3.45	15I												L
4.00	16I												L
4.15	17I												L
4.30	18I												L
4.45	19I												L
5.00	20I												L
5.15	21I												L
5.30	22I												L
5.45	23I												L
6.00	24I												L
6.15	25I												L
6.30	26I												L
6.45	27I												L
7.00	28I												L
7.15	29I												L
7.30	30I												L
7.45	31I												L
8.00	32I												L
8.15	33I												L
8.30	34I												L
8.45	35I												L
9.00	36I												L
9.15	37I												L
9.30	38I												L
9.45	39I												L
10.00	40I												L
10.15	41I												L
10.30	42I												L
10.45	43I												L
11.00	44I												L
11.15	45I												L
11.30	46I												L
11.45	47I												L
12.00	48I												L
12.15	49I												L
12.30	50I												L
12.45	51I												L
13.00	52I												L
13.15	53I												L
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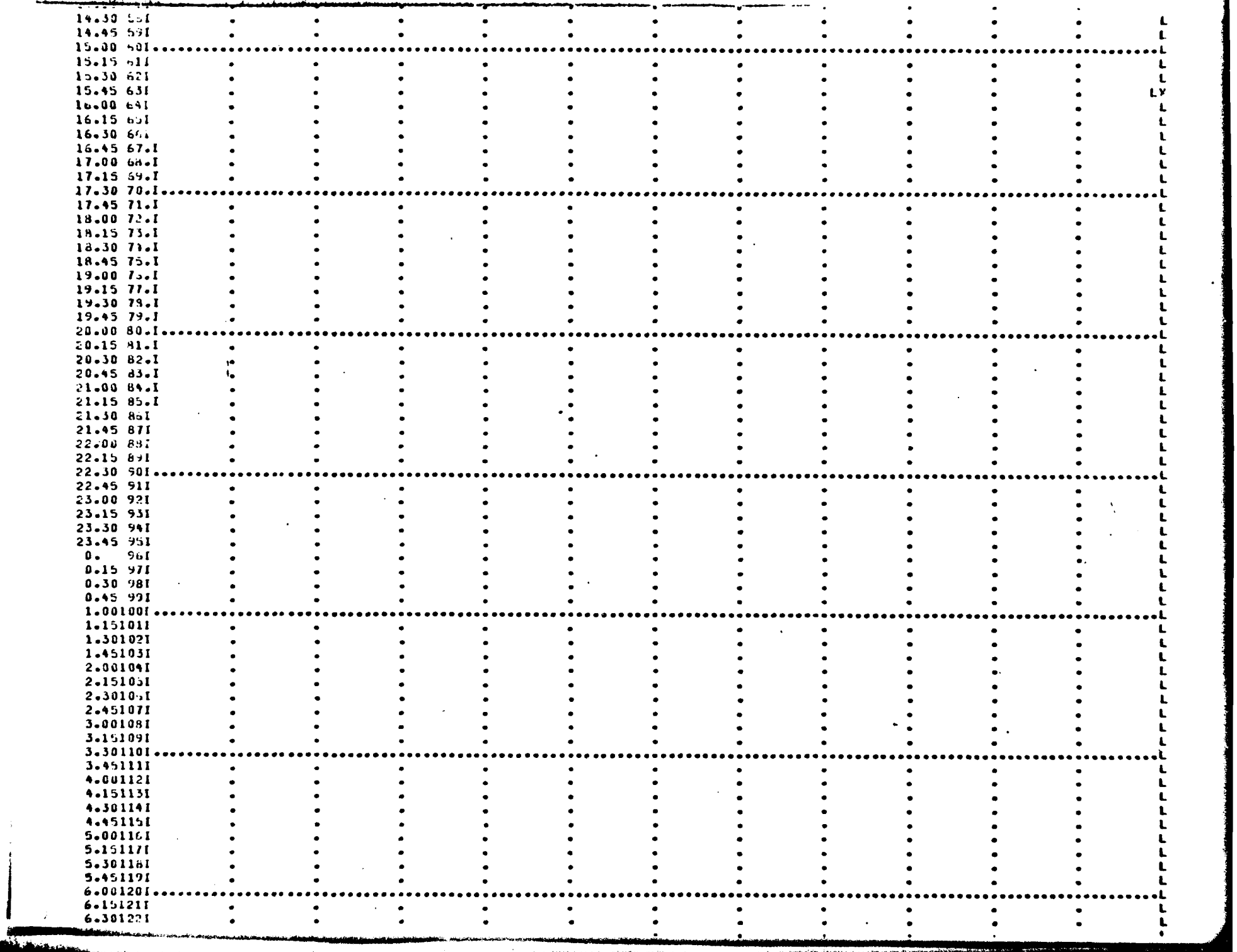
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17.00 68.I
17.15 69.I
17.30 70.I
17.45 71.I
18.00 72.I
18.15 73.I
18.30 74.I
18.45 75.I
19.00 76.I
19.15 77.I
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19.45 79.I
20.00 80.I
20.15 81.I
20.30 82.I
20.45 83.I
21.00 84.I
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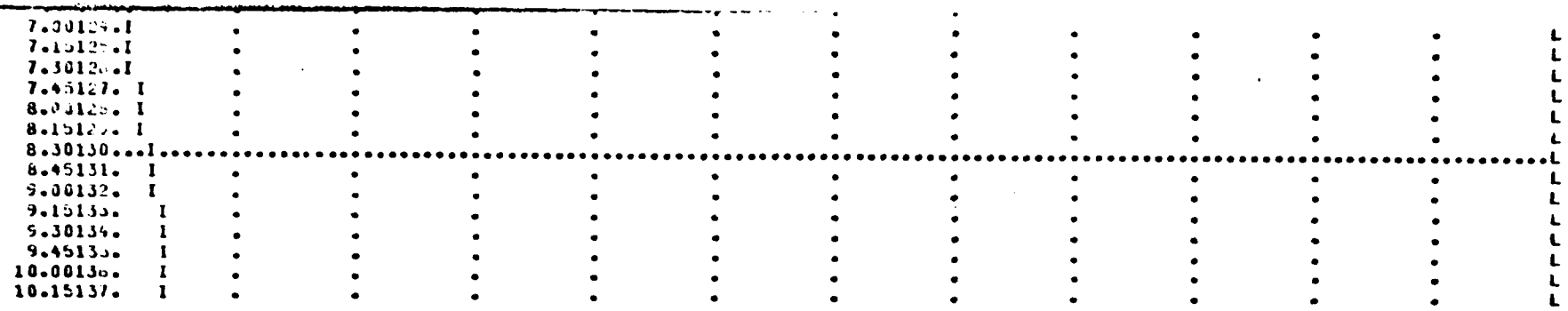
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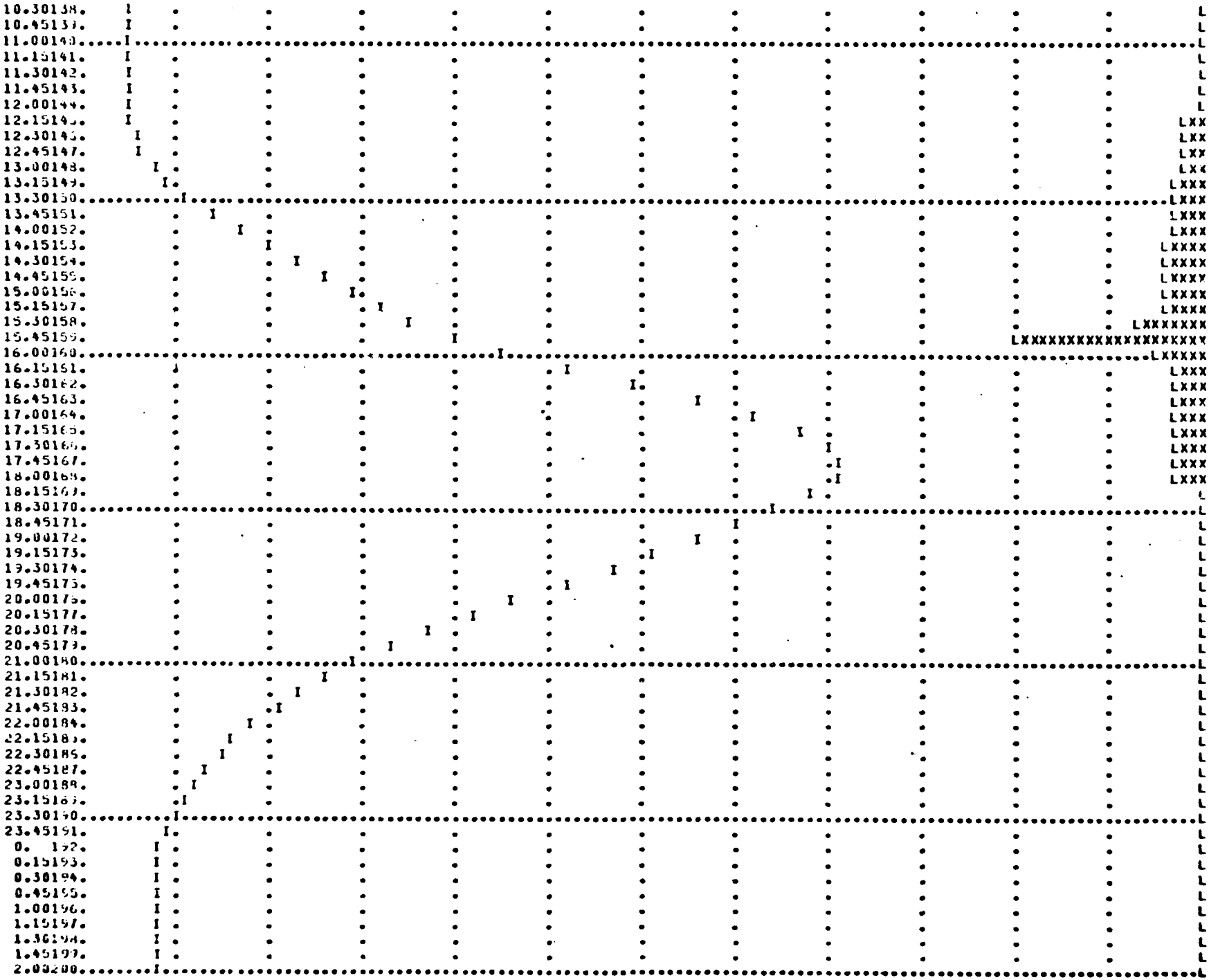

•OWN•

WARNING *** TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA
BOTTOM OF RESERVOIR ASSUMED TO BE AT 984.00
STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1020.00

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	2.	2.	2.	3.
3.	4.	4.	5.	5.	6.	6.	6.	7.	7.
7.	7.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	6.	6.	6.	6.	6.	6.	6.	6.	7.
7.	7.	7.	7.	7.	7.	8.	8.	9.	10.
11.	13.	14.	15.	17.	19.	20.	22.	23.	25.
27.	29.	30.	32.	34.	35.	37.	40.	43.	47.
52.	58.	65.	74.	84.	101.	126.	154.	184.	217.
254.	301.	359.	422.	488.	577.	681.	775.	856.	916.
941.	951.	976.	985.	990.	990.	984.	975.	962.	946.
927.	903.	856.	809.	763.	718.	674.	631.	591.	552.
516.	494.	474.	455.	437.	420.	404.	389.	375.	362.

STORAGE

1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.
1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.
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1224.	1224.	1224.	1224.	1224.	1224.	1224.	1224.	1224.	1224.
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1233.	1234.	1235.	1236.	1238.	1239.	1240.	1242.	1243.	1245.
1246.	1247.	1249.	1250.	1252.	1253.	1255.	1257.	1260.	1263.
1257.	1273.	1279.	1286.	1295.	1304.	1315.	1326.	1338.	1351.
1367.	1384.	1403.	1423.	1444.	1466.	1486.	1505.	1520.	1534.
1544.	1553.	1559.	1563.	1565.	1565.	1563.	1559.	1553.	1546.
1538.	1530.	1520.	1511.	1502.	1493.	1485.	1476.	1468.	1461.
1454.	1447.	1440.	1434.	1428.	1422.	1417.	1412.	1408.	1404.

STAGE

1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0
1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0
1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0
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1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0
1019.0	1019.0	1019.0	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1

1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.3	1019.3
1019.3	1019.3	1019.3	1019.4	1019.4	1019.4	1019.4	1019.4	1019.5	1019.5
1019.6	1019.6	1019.7	1019.8	1019.9	1020.1	1020.2	1020.3	1020.5	1020.7
1020.9	1021.1	1021.3	1021.6	1021.9	1022.2	1022.4	1022.7	1022.9	1023.0
1023.2	1023.3	1023.4	1023.4	1023.4	1023.4	1023.4	1023.4	1023.3	1023.2
1023.1	1023.0	1022.9	1022.7	1022.6	1022.5	1022.4	1022.3	1022.2	1022.1
1022.0	1021.9	1021.8	1021.7	1021.7	1021.6	1021.5	1021.5	1021.4	1021.3

PEAK OUTFLOW IS 990. AT TIME 43.75 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	990.	849.	299.	145.	29022.
CMS	28.	24.	8.	4.	822.
INCHES		5.52	7.79	7.87	7.87
MM		140.27	197.85	199.80	199.80
AC-FT		421.	594.	600.	600.
THOUS CU M		519.	732.	740.	740.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	200.	400.	600.	800.	1000.	1200.	1400.	1600.	1800.	0.	0.	0.
0.15	1I												
0.30	2I												
0.45	3I												
1.00	4I												
1.15	5I												
1.30	6I												
1.45	7I												
2.00	8I												
2.15	9I												
2.30	10I												
2.45	11I												
3.00	12I												
3.15	13I												
3.30	14I												
3.45	15I												
4.00	16I												
4.15	17I												
4.30	18I												
4.45	19I												
5.00	20I												
5.15	21I												
5.30	22I												
5.45	23I												
6.00	24I												
6.15	25I												
6.30	26I												
6.45	27I												
7.00	28I												
7.15	29I												
7.30	30I												
7.45	31I												
8.00	32I												
8.15	33I												
8.30	34I												
8.45	35I												
9.00	36I												
9.15	37I												
9.30	38I												
9.45	39I												
10.00	40I												
10.15	41I												
10.30	42I												
10.45	43I												
11.00	44I												
11.15	45I												
11.30	46I												
11.45	47I												
12.00	48I												
12.15	49I												
12.30	50I												
12.45	51I												
13.00	52I												
13.15	53I												
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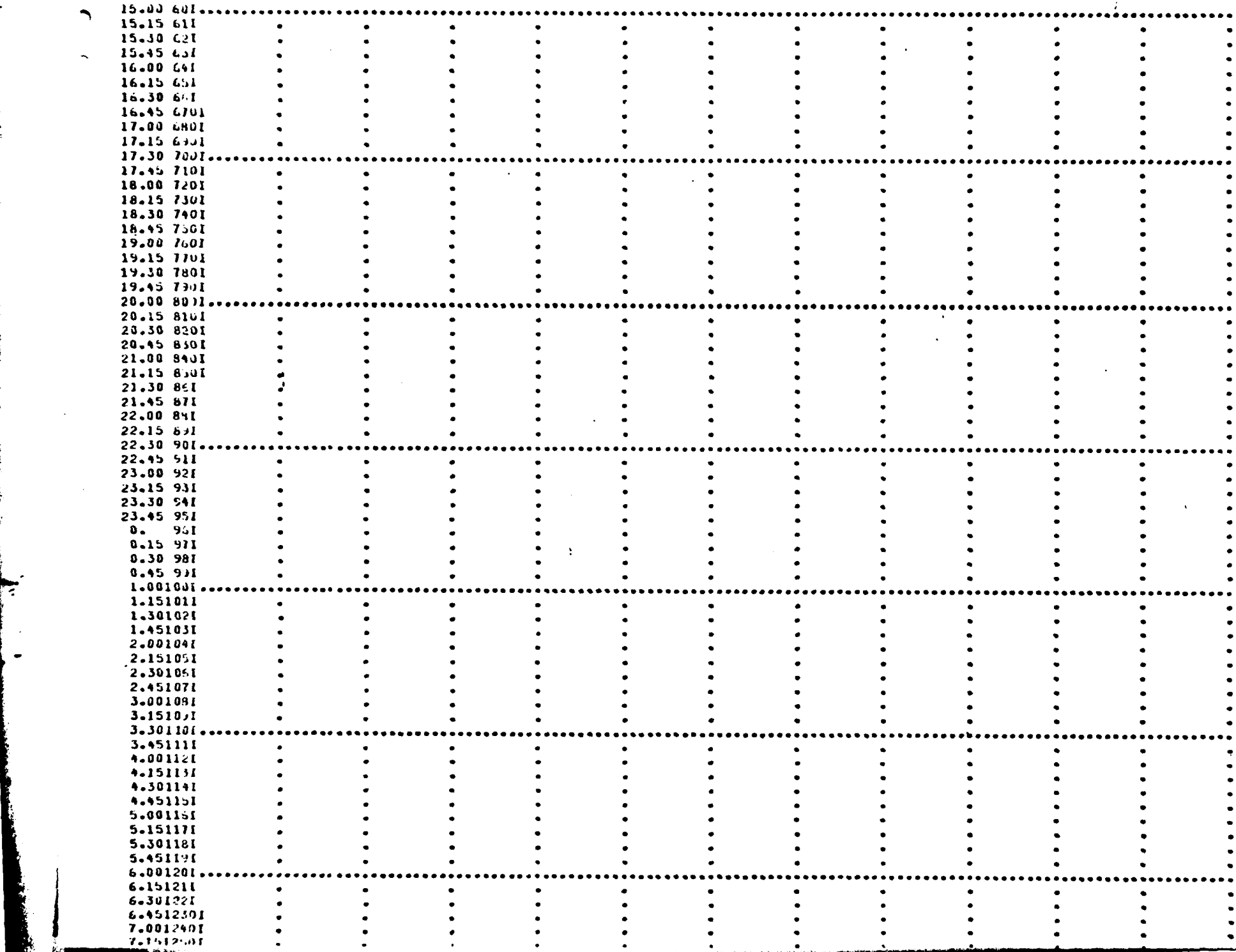
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17.45 71OI
18.00 72OI
18.15 73OI
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18.45 75OI
19.00 76OI
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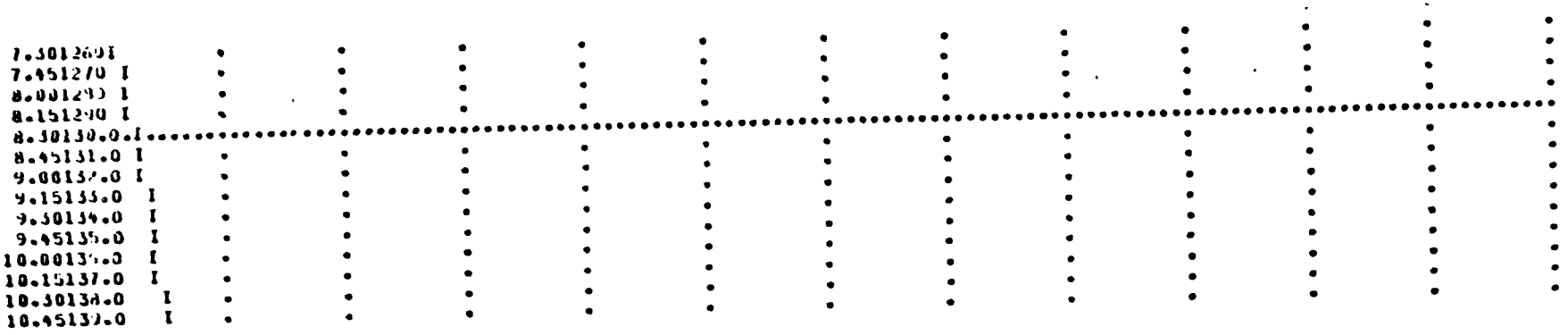
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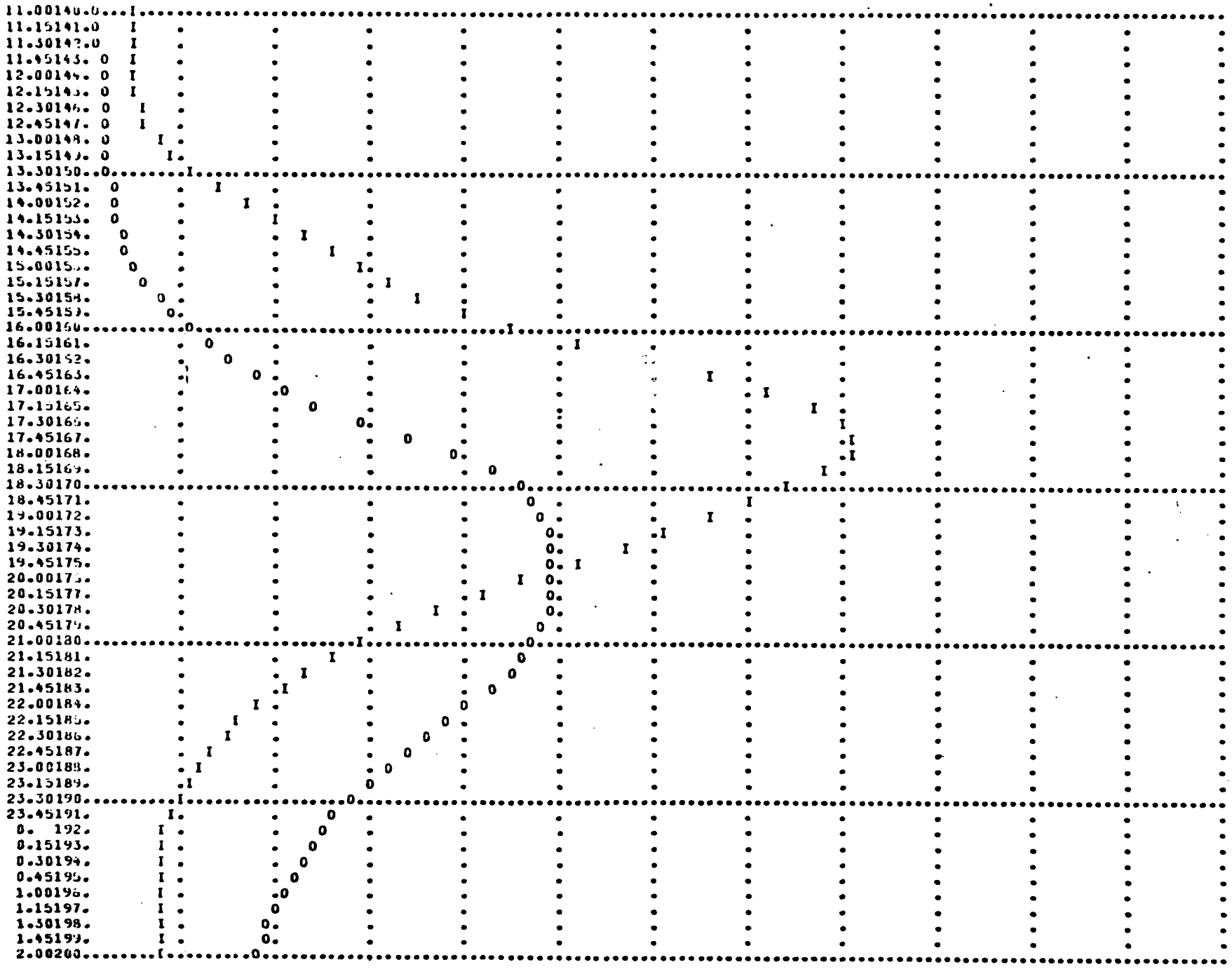

•OVN•

WARNING ••• TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA
BOTTOM OF RESERVOIR ASSUMED TO BE AT 984.00
STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1020.00

STATION 1, PLAN 1, RATIO 6

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	3.	3.	4.	4.	5.
6.	7.	8.	9.	10.	11.	12.	13.	14.	14.
15.	15.	15.	15.	16.	16.	16.	16.	16.	16.
16.	16.	15.	15.	15.	15.	15.	15.	14.	14.
14.	14.	14.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	14.	14.	15.	16.	17.	19.	21.
23.	25.	28.	31.	34.	37.	40.	44.	47.	50.
54.	57.	60.	64.	67.	71.	75.	80.	86.	98.
118.	143.	172.	206.	245.	290.	348.	410.	478.	575.
712.	863.	965.	1433.	2429.	2955.	3163.	3221.	3180.	3074.
2936.	2781.	2612.	2432.	2241.	2049.	1859.	1678.	1511.	1362.
1232.	1121.	1034.	995.	981.	964.	945.	924.	892.	843.
795.	749.	707.	669.	634.	603.	575.	550.	528.	511.

STORAGE

1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1224.
1224.	1224.	1224.	1224.	1224.	1224.	1224.	1224.	1224.	1224.
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1225.	1225.	1225.	1225.	1225.	1225.	1226.	1226.	1227.	1227.
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1235.	1236.	1236.	1235.	1236.	1236.	1237.	1237.	1236.	1236.
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1234.	1234.	1234.	1235.	1235.	1236.	1236.	1238.	1239.	1241.
1243.	1245.	1247.	1249.	1252.	1255.	1257.	1260.	1263.	1266.
1269.	1272.	1275.	1278.	1281.	1284.	1287.	1291.	1297.	1303.
1311.	1321.	1333.	1347.	1363.	1380.	1399.	1419.	1441.	1465.
1492.	1522.	1554.	1587.	1608.	1617.	1621.	1622.	1621.	1619.
1617.	1615.	1612.	1608.	1605.	1601.	1597.	1593.	1589.	1585.
1581.	1577.	1572.	1568.	1561.	1554.	1546.	1537.	1527.	1518.
1509.	1499.	1491.	1484.	1477.	1471.	1465.	1461.	1456.	1452.

STAGE

1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0
1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0
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1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0
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1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.0	1019.1
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.2	1019.2

1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2
1019.2	1019.2	1019.2	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1	1019.1
1019.1	1019.1	1019.1	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2	1019.2
1019.3	1019.3	1019.3	1019.3	1019.4	1019.4	1019.4	1019.5	1019.5	1019.6
1019.6	1019.6	1019.7	1019.7	1019.7	1019.8	1019.8	1019.9	1020.0	1020.0
1020.1	1020.3	1020.4	1020.6	1020.8	1021.0	1021.3	1021.5	1021.8	1022.1
1022.5	1022.9	1023.3	1023.7	1024.0	1024.1	1024.2	1024.2	1024.2	1024.1
1024.1	1024.1	1024.0	1024.0	1024.0	1023.9	1023.9	1023.8	1023.7	1023.7
1023.6	1023.6	1023.5	1023.5	1023.4	1023.3	1023.2	1023.1	1023.0	1022.8
1022.7	1022.6	1022.5	1022.4	1022.3	1022.2	1022.1	1022.1	1022.0	1022.0

PEAK OUTFLOW IS 3221. AT TIME 42.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3221.	2008.	665.	322.	64448.
CMS	91.	57.	19.	9.	1825.
INCHES		13.06	17.31	17.47	17.47
MM		331.82	439.78	443.70	443.70
AC-FT		996.	1320.	1332.	1332.
THOUS CU M		1228.	1628.	1642.	1642.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	400.	800.	1200.	1600.	2000.	2400.	2800.	3200.	3600.	0.	0.	0.
0.15	1I												
0.30	2I												
0.45	3I												
1.00	4I												
1.15	5I												
1.30	6I												
1.45	7I												
2.00	8I												
2.15	9I												
2.30	10I												
2.45	11I												
3.00	12I												
3.15	13I												
3.30	14I												
3.45	15I												
4.00	16I												
4.15	17I												
4.30	18I												
4.45	19I												
5.00	20I												
5.15	21I												
5.30	22I												
5.45	23I												
6.00	24I												
6.15	25I												
6.30	26I												
6.45	27I												
7.00	28I												
7.15	29I												
7.30	30I												
7.45	31I												
8.00	32I												
8.15	33I												
8.30	34I												
8.45	35I												
9.00	36I												
9.15	37I												
9.30	38I												
9.45	39I												
10.00	40I												
10.15	41I												
10.30	42I												
10.45	43I												
11.00	44I												
11.15	45I												
11.30	46I												
11.45	47I												
12.00	48I												
12.15	49I												
12.30	50I												
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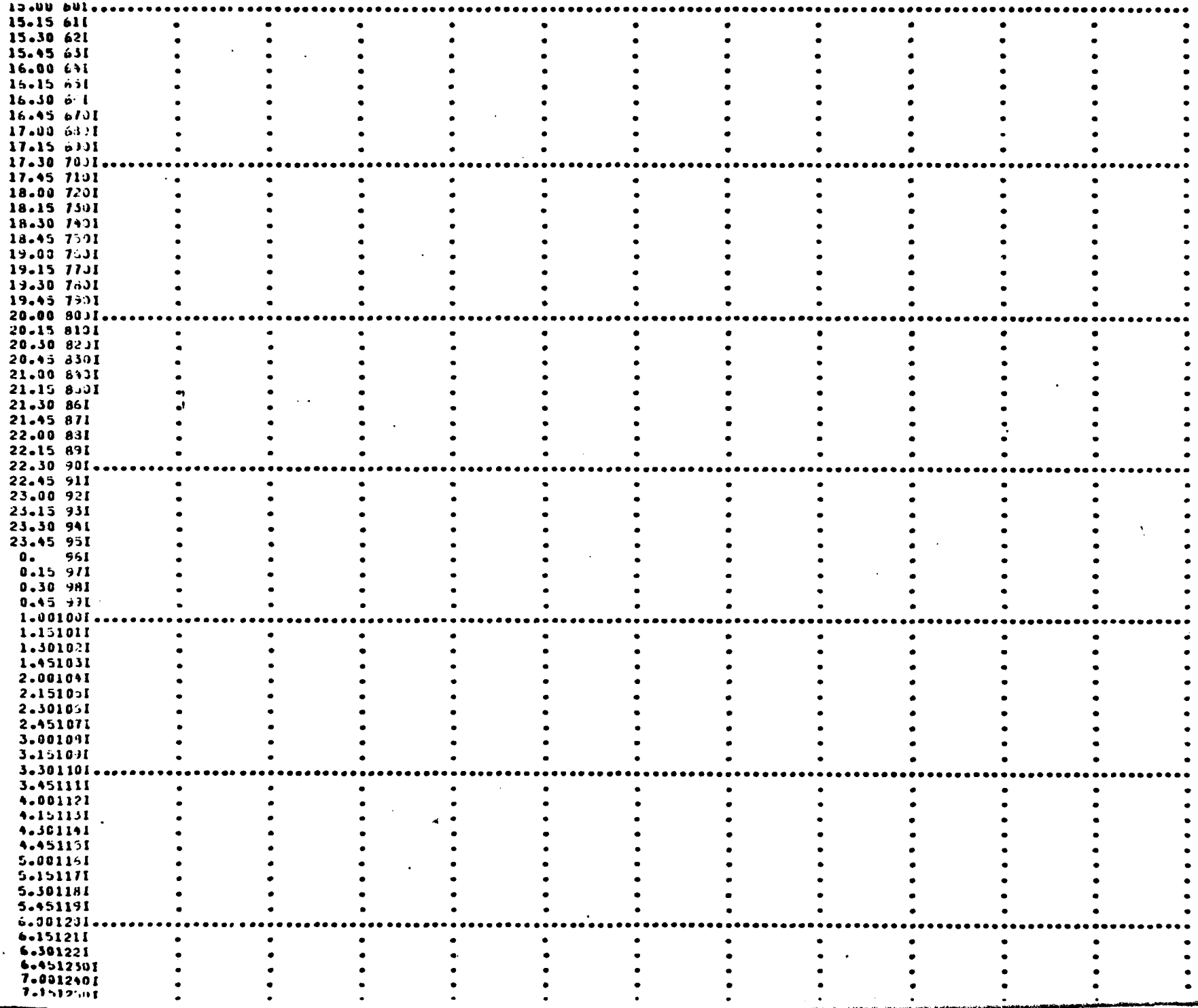
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17.15 69OI
17.30 70OI
17.45 71OI
18.00 72OI
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22.30 90I
22.45 91I
23.00 92I
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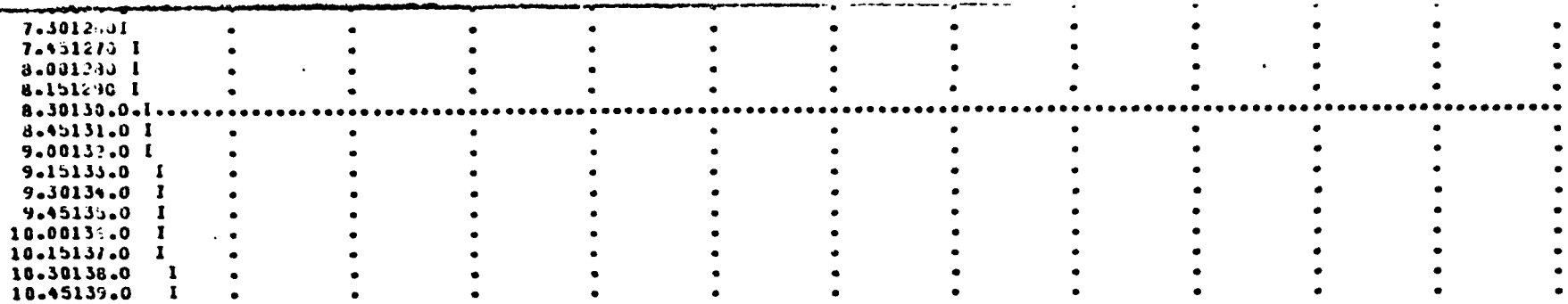
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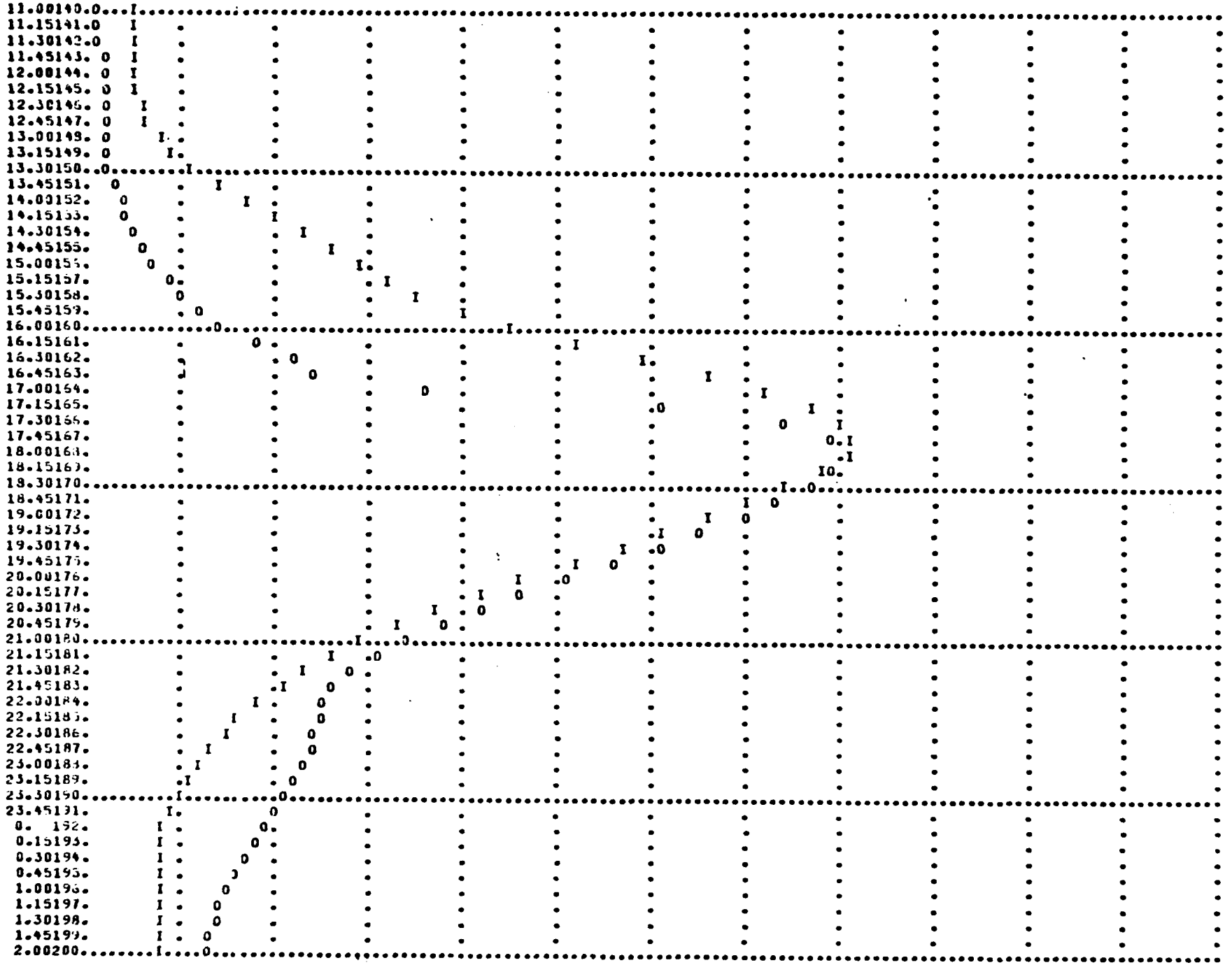
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2.00200.

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.20	RATIO 2 0.40	RATIO 3 0.50	RATIO 4 0.60	RATIO 5 0.80	RATIO 6 1.00
HYDROGRAPH AT	1	1.43	1	651.	1301.	1627.	1952.	2603.	3254.
		(8341.48)	(	18.43)(	36.85)(	46.07)(	55.28)(	73.71)(	92.13)(
ROUTED TO	1	1.43	1	316.	800.	990.	1600.	2507.	3221.
		(8341.48)	(	8.96)(	22.66)(	28.03)(	45.30)(	70.99)(	91.20)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1019.00	1019.00	1023.50
STORAGE	1223.	1223.	1570.
OUTFLOW	0.	0.	1000.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	1021.15	0.	1389.	316.	0.	44.25	0.
0.40	1022.72	0.	1510.	800.	0.	43.75	0.
0.50	1023.44	0.	1565.	990.	0.	43.75	0.
0.60	1023.78	0.28	1591.	1600.	2.75	43.00	0.
0.80	1024.02	0.52	1610.	2507.	4.00	42.25	0.
1.00	1024.18	0.68	1622.	3221.	5.00	42.00	0.

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

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2) U.S. Department of Commerce, Hydrometeorological Report No. 33, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours; April 1956.

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4) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

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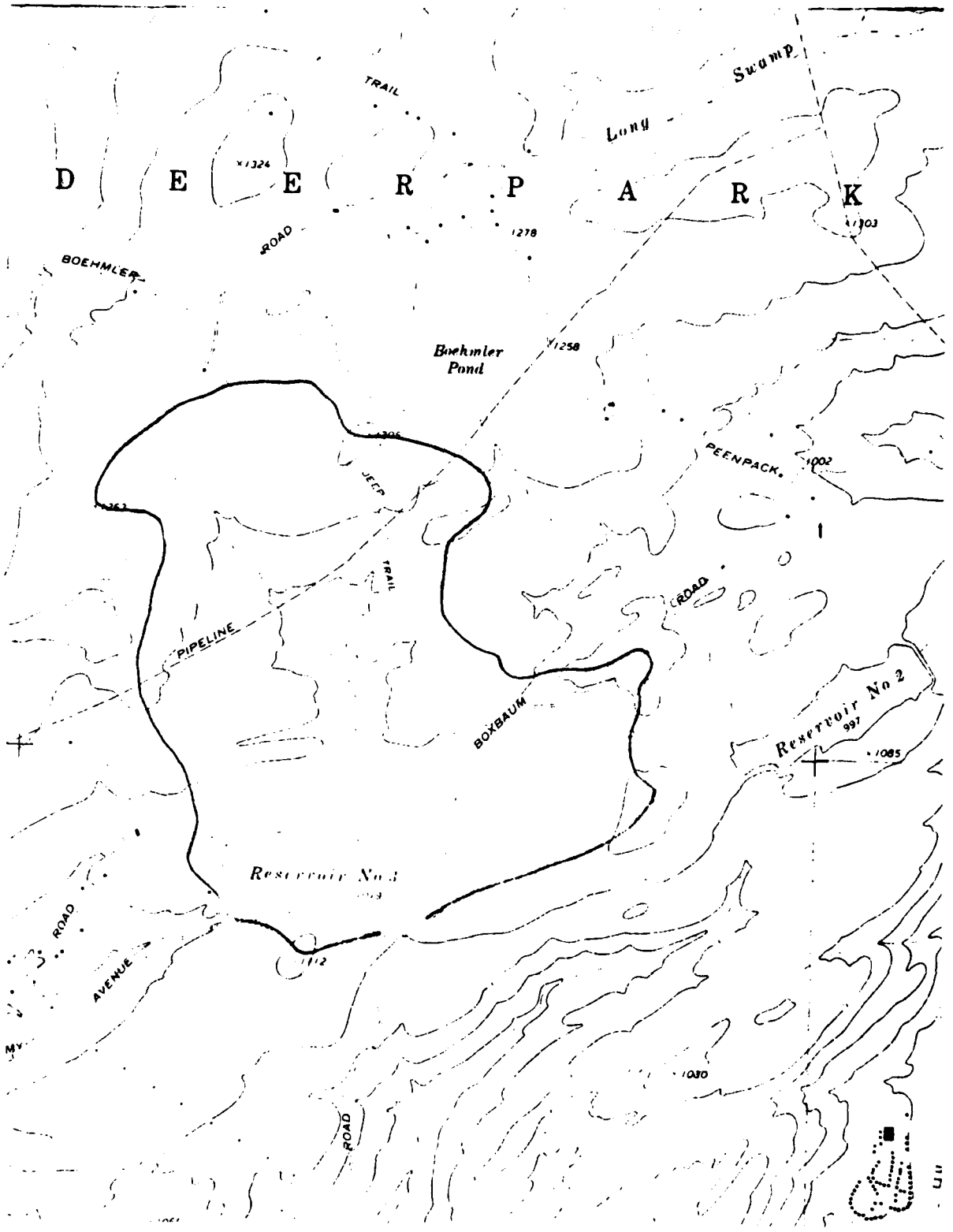
6) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

7) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

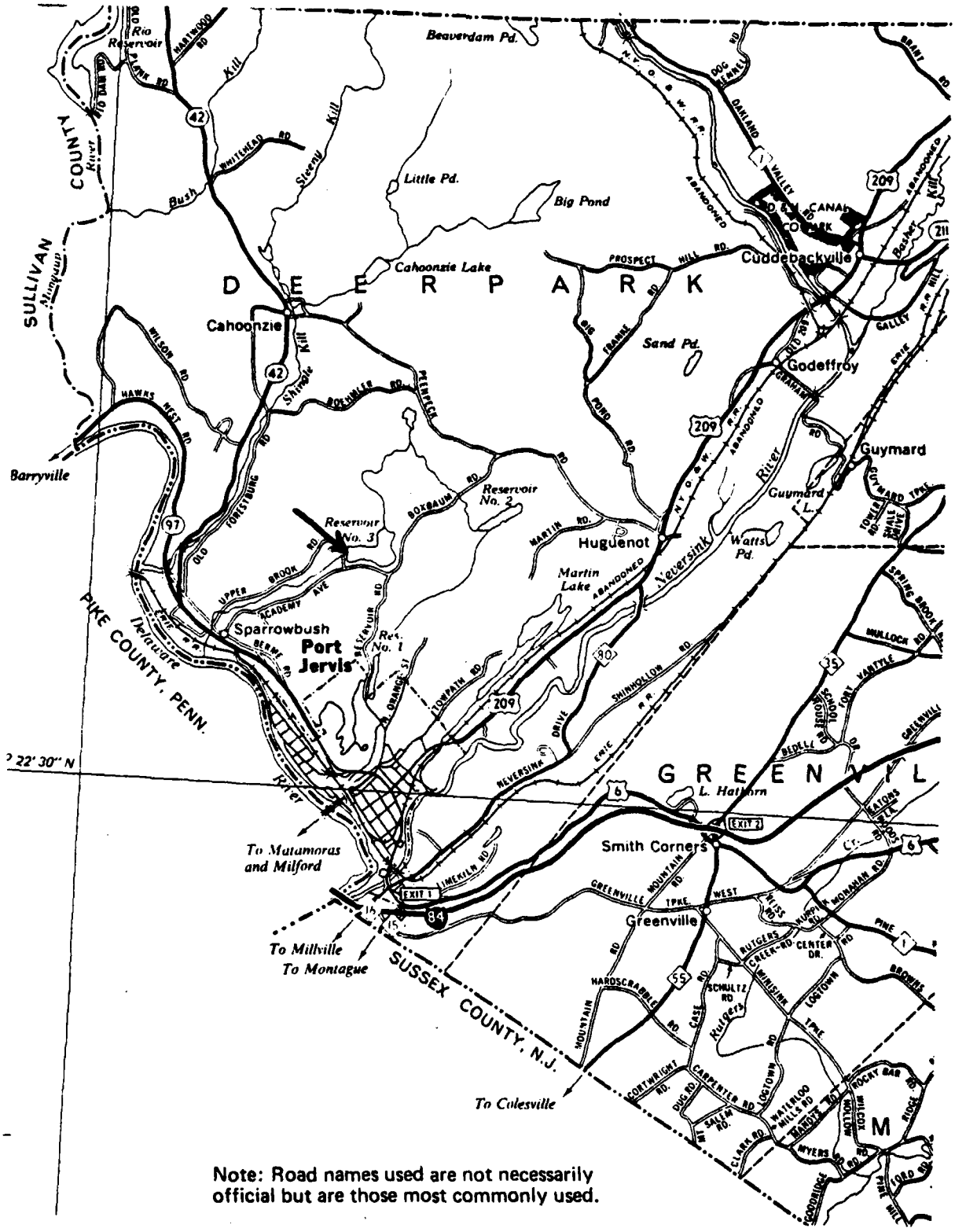
8) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

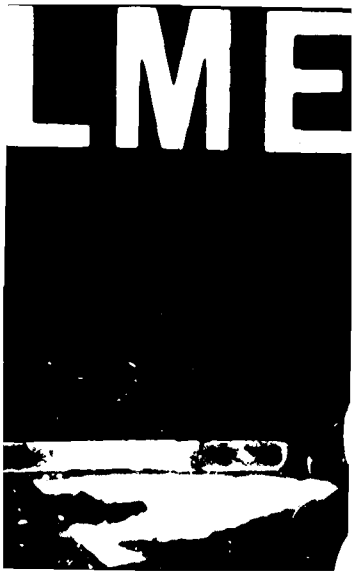
DRAWINGS



TOPOGRAPHIC MAP



VICINITY MAP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